Addendum

Diabetes Dictionary

Blood Glucose Monitoring
A way of testing how much glucose (sugar) is in the blood. A drop of blood, usually taken from the fingertip, is placed on the end of a specially coated strip, called a testing strip. The strip has a chemical on it that makes it change color according to how much glucose is in the blood. A person can tell if the level of glucose is low, high, or normal in one of two ways. The first is by comparing the color on the end of the strip to a color chart that is printed on the side of the test strip container. The second is by inserting the strip into a small machine, called a meter, which "reads" the strip and shows the level of blood glucose in a digital window display. Blood testing is more accurate than urine testing in monitoring blood glucose levels because it shows what the current level of glucose is, rather than what the level was an hour or so previously.

Blood Pressure
The force of the blood on the walls of arteries. Two levels of blood pressure are measured-the higher, or systolic, pressure, which occurs each time the heart pushes blood into the vessels, and the lower, or diastolic, pressure, which occurs when the heart rests. In a blood pressure reading of 120/80, for example, 120 is the systolic pressure and 80 is the diastolic pressure. A reading of 120/80 is said to be the normal range. Blood pressure that is too high can cause health problems such as heart attacks and strokes.

Body Mass Index
Body Mass Index (BMI) – a measure of a person's weight relative to this height. Body mass index is weight in Kilograms divided by height in meters squared. (wt/ht).

Carbohydrate
One of the three main classes of foods and a source of energy. Carbohydrates are mainly sugars and starches that the body breaks down into glucose (a simple sugar that the body can use to feed its cells). The body also uses carbohydrates to make a substance called glycogen that is stored in the liver and muscles for future use. If the body does not have enough insulin or cannot use the insulin it has, then the body will not be able to use carbohydrates for energy the way it should. This condition is called diabetes. See also: Fats; protein.

Cholesterol
A fat-like substance found in blood, muscle, liver, brain, and other tissues in people and animals. The body makes and needs some cholesterol. Too much cholesterol, however, may cause fat to build up in the artery walls and cause a disease that slows or stops the flow of blood. Butter and egg yolks are foods that have a lot of cholesterol.

Complications of Diabetes
Harmful effects that may happen when a person has diabetes. Some effects, such as hypoglycemia, can happen any time. Others develop when a person has had diabetes for a long time. These include damage to the retina of the eye (retinopathy), the blood vessels (angiopathy), the nervous system (neuropathy), and the kidneys (nephropathy). Studies show that keeping blood glucose levels as close to the normal, nondiabetic range as possible may help prevent, slow, or delay harmful effects to the eyes, kidneys, and nerves.

Diabetes Mellitus
A disease that occurs when the body is not able to use sugar as it should. The body needs sugar for growth and energy for daily activities. It gets sugar when it changes food into glucose (a form of sugar). A hormone called insulin is needed for the glucose to be taken up and used by the

body. Diabetes occurs when the body cannot make use of the glucose in the blood for energy because either the pancreas is not able to make enough insulin or the insulin that is available is not effective. The beta cells in areas of the pancreas called the islets of Langerhans usually make insulin.

There are two main types of diabetes mellitus: insulin-dependent (type 1) and noninsulin-dependent (type 2). In insulin-dependent diabetes (IDDM), the pancreas makes little or no insulin because the insulin-producing beta cells have been destroyed. This type usually appears suddenly and most commonly in younger people under age 30. Treatment consists of daily insulin injections or use of an insulin pump, a planned diet and regular exercise, and daily self-monitoring of blood glucose.

In type 2, noninsulin-dependent diabetes, the pancreas makes some insulin, sometimes too much. The insulin, however, is not effective (see Insulin Resistance). Diet and exercise and daily monitoring of glucose levels control type 2. Sometimes oral drugs that lower blood glucose levels or insulin injections are needed. This type of diabetes usually develops gradually, most often in people over 40 years of age. Type 2 accounts for 90 to 95 percent of diabetes.
The signs of diabetes include having to urinate often, losing weight, getting very thirsty, and being hungry all the time. Other signs are blurred vision, itching, and slow healing of sores. People with untreated or undiagnosed diabetes are thirsty and have to urinate often because glucose builds to a high level in the bloodstream and the kidneys are working hard to flush out the extra amount. People with untreated diabetes often get hungry and tired because the body is not able to use food the way it should.

In type 1, insulin-dependent diabetes, if the level of insulin is too low for a long period of time, the body begins to break down its stores of fat for energy. This causes the body to release acids (ketones) into the blood. The result is called ketoacidosis, a severe condition that may put a person into a coma if not treated right away.

The causes of diabetes are not known. Scientists think that insulin-dependent diabetes may be more than one disease and may have many causes. They are looking at hereditary (whether or not the person has parents or other family members with the disease) and at factors both inside and outside the body, including viruses.

Type 2 diabetes appears to be closely associated with obesity and with the body resisting the action of insulin.

Diabetic Ketoacidosis (DKA)
Severe, out-of-control diabetes (high blood sugar) that needs emergency treatment. DKA happens when blood sugar levels get too high. This may happen because of illness, taking too little insulin, or getting too little exercise. The body starts using stored fat for energy, and ketone bodies (acids) build up in the blood.

Ketoacidosis starts slowly and builds up. The signs include nausea and vomiting, which can lead to loss of water from the body, stomach pain, and deep and rapid breathing. Other signs are a flushed face, dry skin and mouth, a fruity breath odor, a rapid and weak pulse, and low blood pressure. If the person is not given fluids and insulin right away, ketoacidosis can lead to coma and even death.

Diabetic Retinopathy
A disease of the small blood vessels of the retina of the eye. When retinopathy first starts, the tiny blood vessels in the retina become swollen, and they leak a little fluid into the center of the retina. The person's sight may be blurred. This condition is called background retinopathy. About 80 percent of people with background retinopathy never have serious vision problems, and the disease never goes beyond this first stage.

However, if retinopathy progresses, the harm to sight can be more serious. Many new, tiny blood vessels grow out and across the eye. This is called neovascularization. The vessels may break and bleed into the clear gel that fills the center of the eye, blocking vision. Scar tissue may also form near the retina, pulling it away from the back of the eye. This stage is called proliferative retinopathy, and it can lead to impaired vision and even blindness. See also: Photocoagulation or vitrectomy for treatments.

Fasting Blood Glucose Test
A method for finding out how much glucose (sugar) is in the blood. The test can show if a person has diabetes. A blood sample is taken in a lab or doctor's office. The test is usually done in the morning before the person has eaten. The normal, nondiabetic range for blood glucose is from 70 to 110 mg/dl, depending on the type of blood being tested. If the level is over 140 mg/dl, it usually means the person has diabetes (except for newborns and some pregnant women).

Fats
One of the three main classes of foods and a source of energy in the body. Fats help the body use some vitamins and keep the skin healthy. They also serve as energy stores for the body. In food, there are two types of fats: saturated and unsaturated.

Saturated fats are solid at room temperature and come chiefly from animal food products. Some examples are butter, lard, meat fat, solid shortening, palm oil, and coconut oil. These fats tend to raise the level of cholesterol, a fat-like substance in the blood.

Unsaturated fats, which include monounsaturated fats and polyunsaturated fats, are liquid at room temperature and come from plant oils such as olive, peanut, corn, cottonseed, sunflower, safflower, and soybean. These fats tend to lower the level of cholesterol in the blood. See also: Carbohydrate; protein.

Fatty Acids
A basic unit of fats. When insulin levels are too low or there is not enough glucose (sugar) to use for energy, the body burns fatty acids for energy. The body then makes ketone bodies, waste products that cause the acid level in the blood to become too high. This in turn may lead to ketoacidosis, a serious problem. See also: Diabetic ketoacidosis.

Fiber
A substance found in foods that come from plants. Fiber helps in the digestive process and is thought to lower cholesterol and help control blood glucose (sugar). The two types of fiber in food are soluble and insoluble. Soluble fiber, found in beans, fruits, and oat products, dissolves in water and is thought to help lower blood fats and blood glucose (sugar). Insoluble fiber, found in whole-grain products and vegetables, passes directly through the digestive system, helping to rid the body of waste products.

Foot Care
Taking special steps to avoid foot problems such as sores, cuts, bunions, and calluses. Good care includes daily examination of the feet, toes, and toenails and choosing shoes and socks or stockings that fit well. People with diabetes have to take special care of their feet because nerve damage and reduced blood flow sometimes mean they will have less feeling in their feet than normal. They may not notice cuts and other problems as soon as they should.

Glucose
A simple sugar found in the blood. It is the body's main source of energy; also known as dextrose. See also: Blood glucose.

Glucose Tolerance Test
A test to see if a person has diabetes. The test is given in a lab or doctor's office in the morning before the person has eaten. A first sample of blood is taken from the person. Then the person drinks a liquid that has glucose (sugar) in it. After one hour, a second blood sample is drawn, and, after another hour, a third sample is taken. The object is to see how well the body deals with the glucose in the blood over time.

Glycosylated Hemoglobin Test
A blood test that measures a person's average blood glucose (sugar) level for the 2- to 3-month period before the test. See: Hemoglobin subscript.

Gram
A unit of weight in the metric system. There are 28 grams in 1 ounce. In some diet plans for people with diabetes, the suggested amounts of food are given in grams.

Hemoglobin A_{1c} (HbA_{1c})
The substance of red blood cells that carries oxygen to the cells and sometimes joins with glucose (sugar). Because the glucose stays attached for the life of the cell (about 4 months), a test to measure hemoglobin $\mathbf{A_{1c}}$ shows what the person's average blood glucose level was for that period of time.

Heredity
The passing of a trait such as color of the eyes from parent to child. A person "inherits" these traits through the genes.

High Blood Pressure
When the blood flows through the vessels at a greater than normal force. High blood pressure strains the heart; harms the arteries; and increases the risk of heart attack, stroke, and kidney problems. Also called hypertension.

Home Blood Glucose Monitoring
A way a person can test how much glucose (sugar) is in the blood. Also called self-monitoring of blood glucose. See also: Blood glucose monitoring.

Hormone
A chemical released by special cells to tell other cells what to do. For instance, insulin is a hormone made by the beta cells in the pancreas. When released, insulin tells other cells to use glucose (sugar) for energy.

Human Insulin
Man-made insulins that are similar to insulin produced by your own body. Human insulin has been available since October 1982.

Hyperglycemia
Too high a level of glucose (sugar) in the blood; a sign that diabetes is out of control. Many things can cause hyperglycemia. It occurs when the body does not have enough insulin or cannot use the insulin it does have to turn glucose into energy. Signs of hyperglycemia are a great thirst, a dry mouth, and a need to urinate often. For people with insulin-dependent diabetes, hyperglycemia may lead to diabetic ketoacidosis.

Hypertension
Blood pressure that is above the normal range. See also: High blood pressure.

Hypoglycemia
Too low a level of glucose (sugar) in the blood. This occurs when a person with diabetes has injected too much insulin, eaten too little food, or has exercised without extra food. A person with hypoglycemia may feel nervous, shaky, weak, or sweaty, and have a headache, blurred vision, and hunger. Taking small amounts of sugar, sweet juice, or food with sugar will usually help the person feel better within 10-15 minutes. See also: Insulin shock.

Impaired Glucose Tolerance (IGT)
Blood glucose (sugar) levels higher than normal but not high enough to be called diabetes. People with IGT may or may not develop diabetes. Other names (no longer used) for IGT are "borderline," "subclinical," "chemical," or "latent" diabetes.

Injection
Putting liquid into the body with a needle and syringe. A person with diabetes injects insulin by putting the needle into the tissue under the skin (called subcutaneous). Other ways of giving medicine or nourishment by injection are to put the needle into a vein (intravenous) or into a muscle (intramuscular).

Injection Sites
Places on the body where people can inject insulin most easily. These are:

- The outer area of the upper arm.
- Just above and below the waist, except the area right around the navel (a 2-inch circle).
- The upper area of the buttock, just behind the hip bone.
- The front of the thigh, midway to the outer side, 4 inches below the top of the thigh to 4 inches above the knee.

These areas can vary with the size of the person.

Injection Site Rotation
Changing the places on the body where a person injects insulin. Changing the injection site keeps lumps or small dents from forming in the skin. These lumps or dents are called lipodystrophies. However, people should try to use the same body area for injections that are given at the same time each day-for example, always using the stomach for the morning injection or an arm for the evening injection. Using the same body area for these routine injections lessens the possibility of changes in the timing and action of insulin.

Insulin
A hormone that helps the body use glucose (sugar) for energy. The beta cells of the pancreas (in areas called the islets of Langerhans) make the insulin. When the body cannot make enough insulin on its own, a person with diabetes must inject insulin made from other sources, i.e., beef, pork, human insulin (recombinant DNA origin), or human insulin (pork-derived, semisynthetic).

Insulin Reaction
Too low a level of glucose (sugar) in the blood; also called hypoglycemia. This occurs when a person with diabetes has injected too much insulin, eaten too little food, or exercised without extra food. The person may feel hungry, nauseated, weak, nervous, shaky, confused, and sweaty. Taking small amounts of sugar, sweet juice, or food with sugar will usually help the person feel better within 10-15 minutes. See also: Hypoglycemia; insulin shock.

Insulin Receptors
Areas on the outer part of a cell that allow the cell to join or bind with insulin that is in the blood. When the cell and insulin bind together, the cell can take glucose (sugar) from the blood and use it for energy.

Insulin Resistance
Many people with type 2 produce enough insulin, but their bodies do not respond to the action of insulin. This may happen because the person is overweight and has too many fat cells, which do not respond well to insulin. Also, as people age, their body cells lose some of the ability to respond to insulin. Insulin resistance is also linked to high blood pressure and high levels of fat in the blood. Another kind of insulin resistance may happen in some people who take insulin injections. They may have to take very high doses of insulin every day (200 units or more) to bring their blood glucose (sugar) down to the normal range. This is also called "insulin insensitivity.

Ketone Bodies
Chemicals that the body makes when there is not enough insulin in the blood and it must break down fat for its energy. Ketone bodies can poison and even kill body cells. When the body does not have the help of insulin, the ketones build up in the blood and then "spill" over into the urine so that the body can get rid of them. The body can also rid itself of one type of ketone, called acetone, through the lungs. This gives the breath a fruity odor. Ketones that build up in the body for a long time lead to serious illness and coma. See also: Diabetic ketoacidosis.

Ketonuria
Having ketone bodies in the urine; a warning sign of diabetic ketoacidosis (DKA).

Ketosis
A condition of having ketone bodies build up in body tissues and fluids. The signs of ketosis are nausea, vomiting, and stomach pain. Ketosis can lead to ketoacidosis.

Macrovascular Disease
A disease of the large blood vessels that sometimes occurs when a person has had diabetes for a long time. Fat and blood clots build up in the large blood vessels and stick to the vessel walls. Three kinds of macrovascular disease are coronary disease, cerebrovascular disease, and peripheral vascular disease.

Meal Plan
A guide for controlling the amount of calories, carbohydrates, proteins, and fats a person eats. People with diabetes can use such plans as the Exchange Lists or the Point System to help them plan their meals so that they can keep their diabetes under control. See also: Exchange lists; point system.

Metabolism
The term for the way cells chemically change food so that it can be used to keep the body alive. It is a two-part process. One part is called catabolism-when the body uses food for energy. The other is called anabolism-when the body uses food to build or mend cells. Insulin is necessary for the metabolism of food.

Mg/dL
Milligrams per deciliter. Term used to describe how much glucose (sugar) is in a specific amount of blood. In self-monitoring of blood glucose, test results are given as the amount of glucose in milligrams per deciliter of blood. A fasting reading of 70 to 110 mg/dL is considered in the normal (nondiabetic) range.

Nephropathy
Disease of the kidneys caused by damage to the small blood vessels or to the units in the kidneys that clean the blood. People who have had diabetes for a long time may have kidney damage.

Neurologist
A doctor who sees and treats people with problems of the nervous system.

Neuropathy
Disease of the nervous system. Many people who have had diabetes for a while have nerve damage. The three major forms of nerve damage are: peripheral neuropathy, autonomic neuropathy, and mononeuropathy. The most common form is peripheral neuropathy, which mainly affects the feet and legs. See also: Peripheral neuropathy; autonomic neuropathy; mononeuropathy.

Noninvasive Blood Glucose Monitoring
A way to measure blood glucose without having to prick the finger to obtain a blood sample. Several noninvasive devices are currently being developed.

Nonketotic Coma
A type of coma caused by a lack of insulin. A nonketotic crisis means: (1) very high levels of glucose (sugar) in the blood; (2) absence of ketoacidosis; (3) great loss of body fluid; and (4) a sleepy, confused, or comatose state. Nonketotic coma often results from some other problem such as a severe infection or kidney failure

Obesity
Obesity is a condition of an abnormally high proportion of body fat. A body mass index, of greater than or equal to 30 is the current definition of obesity. Fat works against the action of insulin. Extra body fat is thought to be a risk factor for diabetes.

Oral Hypoglycemic Agents
Pills or capsules that people take to lower the level of glucose (sugar) in the blood. The pills work for some people whose pancreas still makes some insulin. They can help the body in several ways such as causing the cells in the pancreas to release more insulin.

Six types of these pills are for sale in the United States. Four, known as "first-generation" drugs, have been in use for some time. Two types, called "second-generation" drugs, have been developed recently. They are stronger than first-generation drugs and have fewer side effects. All oral hypoglycemic agents belong to a class of drugs known as sulfonylureas. Each type of pill is sold under two names: one is the generic name as listed by the Food and Drug Administration; the other is the trade name given by the manufacturer.

Pancreas
An organ behind the lower part of the stomach that is about the size of a hand. It makes insulin so that the body can use glucose (sugar) for energy. It also makes enzymes that help the body digest food. Spread all over the pancreas are areas called the islets of Langerhans. The cells in these areas each have a special purpose. The alpha cells make glucagon, which raises the level of glucose in the blood; the beta cells make insulin; the delta cells make somatostatin. There are also the PP cells and the D1 cells, about which little is known.

Peripheral Neuropathy
Nerve damage, usually affecting the feet and legs; causing pain, numbness, or a tingling feeling. Also called "somatic neuropathy" or "distal sensory polyneuropathy."

Peripheral Vascular Disease (PVD)
Disease in the large blood vessels of the arms, legs, and feet. People who have had diabetes for a long time may get this because major blood vessels in their arms, legs, and feet are blocked and these limbs do not receive enough blood. The signs of PVD are aching pains in the arms, legs, and feet (especially when walking) and foot sores that heal slowly. Although people with diabetes cannot always avoid PVD, doctors say they have a better chance of avoiding it if they take good care of their feet, do not smoke, and keep both their blood pressure and diabetes under good control. See also: Macrovascular disease.

Pharmacist
A person trained to prepare and distribute medicines and to give information about them.

Podiatrist
A doctor who treats and takes care of people's feet.

Protein
One of the three main classes of food. Proteins are made of amino acids, which are called the building blocks of the cells. The cells need proteins to grow and to mend themselves. Protein is found in many foods such as meat, fish, poultry, and eggs. See also: Carbohydrate; fats.

Pruritus
Itching skin; may be a symptom of diabetes.

Retinopathy
A disease of the small blood vessels in the retina of the eye. See also: Diabetic retinopathy.

Risk Factor
Anything that raises the chance that a person will get a disease. With type 2 diabetes, people have a greater risk of getting the disease if they weigh a lot more (20 percent or more) than they should

Saccharin
A man-made sweetener that people use in place of sugar because it has no calories.

Saturated Fat
A type of fat that comes from animals. See also: Fats.

Self-Monitoring of Blood Glucose
A way as person can test how much glucose (sugar) is in the blood. Also called home blood glucose monitoring. See also: Blood glucose monitoring.

Somogyi Effect
A swing to a high level of glucose (sugar) in the blood from an extremely low level, usually occurring after an untreated insulin reaction during the night. The swing is caused by the release of stress hormones to counter low glucose levels. People who experience high levels of blood glucose in the morning may need to test their blood glucose levels in the middle of the night. If blood glucose levels are falling or low, adjustments in evening snacks or insulin doses may be recommended. This condition is named after Dr. Michael Somogyi, the man who first wrote about it. Also called "rebound."

Sorbitol
A sugar alcohol the body uses slowly. It is a sweetener used in diet foods. It is called a nutritive sweetener because it has four calories in every gram, just like table sugar and starch.
Sorbitol is also produced by the body. Too much sorbitol in cells can cause damage. Diabetic retinopathy and neuropathy may be related to too much sorbitol in the cells of the eyes and nerves.

Stroke
Disease caused by damage to blood vessels in the brain. Depending on the part of the brain affected, a stroke can cause a person to lose the ability to speak or move a part of the body such as an arm or a leg. Usually only one side of the body is affected. See also: Cerebrovascular disease.

Subcutaneous Injection
Putting a fluid into the tissue under the skin with a needle and syringe. See also: Injection.

Sucrose
Table sugar; a form of sugar that the body must break down into a more simple form before the blood can absorb it and take it to the cells.

Sugar
A class of carbohydrates that taste sweet. Sugar is a quick and easy fuel for the body to use. Types of sugar are lactose, glucose, fructose, and sucrose.

Sulfonylureas
Pills or capsules that people take to lower the level of glucose (sugar) in the blood. See also: Oral hypoglycemic agents.

Symptom
A sign of disease. Having to urinate often is a symptom of diabetes.

Syndrome
A set of signs or a series of events occurring together that make up a disease or health problem.

Syndrome X
Term describing a combination of health conditions that place a person at high risk for heart disease. These conditions are type 2 diabetes, high blood pressure, high insulin levels, and high levels of fat in the blood.

Syringe
A device used to inject medications or other liquids into body tissues. The syringe for insulin has a hollow plastic or glass tube (barrel) with a plunger inside. The plunger forces the insulin through the needle into the body. Most insulin syringes now come with a needle attached. The side of the syringe has markings to show how much insulin is being injected.

Trauma
A wound, hurt, or injury to the body. Trauma can also be mental such as when a person feels great stress.

Triglyceride
A type of blood fat. The body needs insulin to remove this type of fat from the blood. When diabetes is under control and a person's weight is what it should be, the level of triglycerides in the blood is usually about what it should be.

Twenty-Four Hour Urine
The total amount of a person's urine for a 24-hour period.

Type 1 Diabetes Mellitus
A chronic condition in which the pancreas makes little or no insulin because the beta cells have been destroyed. The body is then not able to use the glucose (blood sugar) for energy. Type 1 usually comes on abruptly, although the damage to the beta cells may begin much earlier. The signs of type 1 are a great thirst, hunger, a need to urinate often, and loss of weight. To treat the disease, the person must inject insulin, follow a diet plan, exercise daily, and test blood glucose several times a day. Type 1 usually occurs in children and adults who are under age 30. This type of diabetes used to be known as "juvenile diabetes," "juvenile-onset diabetes," and "ketosis-prone diabetes."

Type 2 Diabetes Mellitus
The most common form of diabetes mellitus; about 90 to 95 percent of people who have diabetes have type 2. Unlike the insulin-dependent type of diabetes, in which the pancreas makes no insulin, people with noninsulin-dependent diabetes produce some insulin, sometimes even large amounts. However, either their bodies do not produce enough insulin or their body cells are resistant to the action of insulin (see Insulin Resistance). People with type 2 can often control their condition by losing weight through diet and exercise. If not, they may need to combine insulin or a pill with diet and exercise. Generally, type 2 occurs in people who are over age 40. Most of the people who have this type of diabetes are overweight. Type 2 diabetes mellitus used to be called "adult-onset diabetes," "maturity-onset diabetes," "ketosis-resistant diabetes," and "stable diabetes."

Urine Testing
Checking urine to see if it contains glucose (sugar) and ketones. Special strips of paper or tablets (called reagents) are put into a small amount of urine or urine plus water. Changes in the color of the strip show the amount of glucose or ketones in the urine. Urine testing is the only way to check for the presence of ketones, a sign of serious illness. However, urine testing is less desirable then blood testing for monitoring the level of glucose in the body. See also: Blood glucose monitoring.

NIH Publication No. 94-3016
August 1994

Do Your Level BEST!

QUESTIONS TO ASK YOUR DOCTOR ABOUT BLOOD SUGAR CONTROL

The Diabetes Control and Complications Trial (DCCT) showed that people with insulin-dependent diabetes who keep blood sugar levels as close to normal as possible can reduce their risk of eye, kidney and nerve disease.

Ask your doctor how you can improve blood sugar control. Questions you may want to ask include:

What is my glycosylated hemoglobin (a test that measures average blood sugar level over the past 2 to 3 months)? What is a normal glycosylated hemoglobin?

_____

How can I get my glycosylated hemoglobin in the normal range?_____

How often and under what conditions should I test my blood sugar? What should I do with the results? What patterns should I try to achieve?

_____

What changes should we make in my program as a result of the findings of the Diabetes Control and Complications Trial (DCCT)?_____

Do I have microalbuminuria (detection of tiny amounts of albumin in urine indicating early diabetic kidney disease)?_____

What effect has diabetes had on my eyes and kidneys?_____

When should I get together with a dietitian to review what I eat?_____

What exercises are best for me? What adjustments to my food or insulin should I make if I plan to exercise?_____

What should my family and friends do if my blood sugar goes so low that I need their help?

_____

(For women) What should I do about taking care of my diabetes if I plan to become pregnant?

_____

How should I take care of my feet?_____

Are there any diabetes groups that I could attend in our area?_____

For an information kit write:
National Diabetes Outreach Program,
One Diabetes Way, Bethesda, Maryland 20892-3600

or

CALL
1-800-GET LEVEL
1-800-438-5383

For release November 1, 1998

National Diabetes Fact Sheet

National estimates and general information on diabetes in the United States

What is diabetes?

Diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. Diabetes can be associated with serious complications and premature death, but persons with diabetes can take measures to reduce the likelihood of such occurrences.

Prevalence of diabetes*

Total: 15.7 million people — 5.9% of the population — have diabetes.

Diagnosed: 10.3 million people

Undiagnosed: 5.4 million people

Incidence of diabetes

New cases diagnosed per year: 798,000

Deaths among persons with diabetes

- Studies have found death rates to be twice as high among middle-aged people with diabetes as among middle-aged people without diabetes.
- Based on death certificate data, diabetes contributed to 193,140 deaths in 1996.
- Diabetes was the seventh leading cause of death listed on U.S. death certificates in 1996, according to CDC's National Center for Health Statistics.
- Diabetes is believed to be underreported on death certificates, both as a condition and as a cause of death.

*For further information on prevalence, see the Appendix.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention
and Health Promotion

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Prevalence of diabetes by age

Age 65 years or older: 6.3 million. *18.4% of all people in this age group have diabetes.*

Age 20 years or older: 15.6 million. *8.2% of all people in this age group have diabetes.*

Under age 20: 123,000. *0.16% of all people in this age group have diabetes.*

Prevalence of diabetes by sex in people 20 years or older*

Men: 7.5 million. *8.2% of all men have diabetes.*

Women: 8.1 million. *8.2% of all women have diabetes.*

Prevalence of diabetes by race/ethnicity in people 20 years or older*

Non-Hispanic whites: 11.3 million. 7.8% of all non-Hispanic whites have diabetes.

Non-Hispanic blacks: 2.3 million. 10.8% of all non-Hispanic blacks have diabetes. On average, non-Hispanic blacks are 1.7 times as likely to have diabetes as non-Hispanic whites of similar age.

Mexican Americans: 1.2 million. 10.6% of all Mexican Americans have diabetes. On average, Mexican Americans are 1.9 times as likely to have diabetes as non-Hispanic whites of similar age.

Other Hispanic/Latino Americans: On average, Hispanic/Latino Americans are almost twice as likely to have diabetes as non-Hispanic whites of similar age. (Sufficient data are not currently available to derive more specific estimates.)

American Indians and Alaska Natives: 9% of American Indians and Alaska Natives have diagnosed diabetes. On average, American Indians and Alaska Natives are 2.8 times as likely to have diagnosed diabetes as non-Hispanic whites of similar age.

Asian Americans and Pacific Islanders: Prevalence data for diabetes among Asian Americans and Pacific Islanders are limited. Some groups within this population are at increased risk for diabetes. For example, data collected from 1988 to 1995 suggest that Native Hawaiians are twice as likely to have diagnosed diabetes as white residents of Hawaii.

*These figures do not include the approximately 123,000 cases of diabetes in children and teenagers in the United States.

The four types of diabetes

Type 1 diabetes was previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes. Type 1 diabetes may account for 5% to 10% of all diagnosed cases of diabetes. Risk factors are less well defined for type 1 diabetes than for type 2 diabetes, but autoimmune, genetic, and environmental factors are involved in the development of this type of diabetes.

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. Type 2 diabetes may account for about 90% to 95% of all diagnosed cases of diabetes. Risk factors for type 2 diabetes include older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance, physical inactivity, and race/ethnicity. African Americans, Hispanic/Latino Americans, American Indians, and some Asian Americans and Pacific Islanders are at particularly high risk for type 2 diabetes.

Gestational diabetes develops in 2% to 5% of all pregnancies but disappears when a pregnancy is over. Gestational diabetes occurs more frequently in African Americans, Hispanic/Latino Americans, American Indians, and persons with a family history of diabetes. Obesity is also associated with higher risk. Women who have had gestational diabetes are at increased risk for later developing type 2 diabetes. In some studies, nearly 40% of women with a history of gestational diabetes developed diabetes in the future.

"**Other specific types**" of diabetes result from specific genetic syndromes, surgery, drugs, malnutrition, infections, and other illnesses. Such types of diabetes may account for 1% to 2% of all diagnosed cases of diabetes.

Complications of diabetes

Heart disease

- Heart disease is the leading cause of diabetes-related deaths. Adults with diabetes have heart disease death rates about 2 to 4 times as high as that of adults without diabetes.

Stroke

- The risk of stroke is 2 to 4 times higher in people with diabetes.

High blood pressure

- An estimated 60% to 65% of people with diabetes have high blood pressure.

Blindness

- Diabetes is the leading cause of new cases of blindness in adults 20 to 74 years old.
- Diabetic retinopathy causes from 12,000 to 24,000 new cases of blindness each year.

Complications of diabetes (continued)

Kidney disease

- Diabetes is the leading cause of end-stage renal disease, accounting for about 40% of new cases.
- 27,851 people with diabetes developed end-stage renal disease in 1995.
- In 1995, a total of 98,872 people with diabetes underwent dialysis or kidney transplantation.

Nervous system disease

- About 60% to 70% of people with diabetes have mild to severe forms of nervous system damage (which often includes impaired sensation or pain in the feet or hands, slowed digestion of food in the stomach, carpal tunnel syndrome, and other nerve problems).
- Severe forms of diabetic nerve disease are a major contributing cause of lower extremity amputations.

Amputations

- More than half of lower limb amputations in the United States occur among people with diabetes.
- From 1993 to 1995, about 67,000 amputations were performed each year among people with diabetes.

Dental disease

- Periodontal disease (a type of gum disease that can lead to tooth loss) occurs with greater frequency and severity among people with diabetes. Periodontal disease has been reported to occur among 30% of people aged 19 years or older with type 1 diabetes.

Complications of pregnancy

- The rate of major congenital malformations in babies born to women with preexisting diabetes varies from 0% to 5% among women who receive preconception care to 10% among women who do not receive preconception care.
- Between 3% to 5% of pregnancies among women with diabetes result in death of the newborn; the rate for women who do not have diabetes is 1.5%.

Other complications

- Diabetes can directly cause acute life-threatening events, such as diabetic ketoacidosis* and hyperosmolar nonketotic coma.*
- People with diabetes are more susceptible to many other illnesses. For example, they are more likely to die of pneumonia or influenza than people who do not have diabetes.

*Diabetic ketoacidosis and hyperosmolar nonketotic coma are medical conditions that can result from biochemical imbalance in uncontrolled diabetes.

Cost

Total (direct and indirect): $98 billion (United States, 1997)

Direct medical costs: $44 billion

Indirect costs: $54 billion (disability, work loss, premature mortality)

This estimate, provided by the American Diabetes Association, is in contrast to higher estimates cited elsewhere that are based on all health care costs incurred by people with diabetes, including costs not resulting from diabetes.

New diagnostic criteria for diabetes*

The new diagnostic criteria for diabetes include the following changes:

- The routine diagnostic test for diabetes is now a fasting plasma glucose test rather than the previously preferred oral glucose tolerance test. (However, in certain clinical circumstances, physicians may still choose to perform the more difficult and costly oral glucose tolerance test.)

- A confirmed** fasting plasma glucose value of greater than or equal to 126 milligrams/deciliter (mg/dL) indicates a diagnosis of diabetes. Previously, a value of greater than or equal to 140 mg/dL had been required for diagnosis.

- In the presence of symptoms of diabetes, a confirmed** nonfasting plasma glucose value of greater than or equal to 200 mg/dL indicates a diagnosis of diabetes.

- When a doctor chooses to perform an oral glucose tolerance test (by administering 75 grams of anhydrous glucose dissolved in water, in accordance with World Health Organization standards, and then measuring the plasma glucose concentration 2 hours later), a confirmed** glucose value of greater than or equal to 200 mg/dL indicates a diagnosis of diabetes.

In pregnant women, different requirements are used to identify the presence of gestational diabetes.

*For further information about the new diagnostic criteria for diabetes, please refer to the "Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus," as referenced in the Appendix.

**Except in certain specified circumstances, abnormal tests must be confirmed by repeat testing on another day.

Treatment of diabetes

Diabetes knowledge, treatment, and prevention strategies advance daily. Treatment is aimed at keeping blood glucose near normal levels at all times. Training in self-management is integral to the treatment of diabetes. Treatment must be individualized and must address medical, psychosocial, and lifestyle issues.

- **Treatment of type 1 diabetes:** Lack of insulin production by the pancreas makes type 1 diabetes particularly difficult to control. Treatment requires a strict regimen that typically includes a carefully calculated diet, planned physical activity, home blood glucose testing several times a day, and multiple daily insulin injections.

- **Treatment of type 2 diabetes:** Treatment typically includes diet control, exercise, home blood glucose testing, and in some cases, oral medication and/or insulin. Approximately 40% of people with type 2 diabetes require insulin injections.

Impaired fasting glucose

Impaired fasting glucose is a new diagnostic category in which persons have fasting plasma glucose values of 110-125 mg/dL. These glucose values are greater than the level considered normal but less than the level that is diagnostic of diabetes. It is estimated that 13.4 million persons, 7.0% of the population, have impaired fasting glucose. Scientists are trying to learn how to predict which of these persons will go on to develop diabetes and how to prevent such progression.

Appendix

How were the estimates in this fact sheet derived?

Periodically, the federal government conducts surveys to determine the health of Americans. Such surveys involve questionnaires and medical tests. Most of the diabetes prevalence and incidence estimates presented in this fact sheet were developed by analyzing the newest available national survey data and then adjusting for changes in the population based on 1997 census estimates. The prevalence of diagnosed diabetes represents the number who said they had diabetes. The prevalence of undiagnosed diabetes represents the number of people who said they did not have diabetes, but when given a fasting plasma glucose test, they did in fact have abnormally elevated blood glucose levels (defined as fasting plasma glucose levels greater than or equal to 126 mg/dL). Other estimates presented in this fact sheet were based on individual surveys, research projects, and registry data. A listing of references and additional data sources is at the end of this fact sheet. Most of the national diabetes prevalence estimates are based on Harris MI, et al.

Has the number of persons with diabetes changed since the first National Diabetes Fact Sheet, which was issued in 1995?

Between the 1995 and 1997 fact sheets, the number of persons with diagnosed diabetes increased from 8 million to 10.3 million, but the number of persons with undiagnosed diabetes decreased. For the 1995 National Diabetes Fact Sheet, the number of persons with undiagnosed diabetes was estimated from research using the oral glucose tolerance test to identify undiagnosed diabetes. In contrast, for the 1997 and 1998 National Diabetes Fact Sheets, the number of persons with undiagnosed diabetes was estimated from research using the fasting plasma glucose test, according to recently enacted recommendations. These tests are not equivalent, however, and fewer cases of undiagnosed diabetes are identified using the fasting plasma glucose test under current recommendations.

An enhanced national effort to identify previously undiagnosed persons may also have contributed to a decrease in the number of persons with undiagnosed diabetes. Continued efforts to identify persons with undiagnosed diabetes, the implementation of new guidelines for screening, and the use of an easier and less expensive diagnostic test are all likely to lead to even further decreases in the number of persons with undiagnosed diabetes and increases in the number of persons with diagnosed diabetes.

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Additional sources

Calcuations were performed by the National Institutes of Health and the Centers for Disease Control and Prevention using data from various surveys including the Third National Health and Nutrition Examination Survey (NHANES III, the National Health Interview Survey (NHIS), and U.S. Census estimates.

Information about American Indians and Alaska Natives was provided by Indian Health Service from its 1996 outpatient database. It does not include persons who receive their care outside Indian Health Service. Statistical analysis was performed by N. Rios Burrows.

Information about Native Hawaiians was provided by the Hawaii Diabetes Control Program and is based on Wen M, Unpublished Analysis of Data from the Behavioral Risk Factor Surveillance System (BRFSS) from 1988-1995.

Acknowledgments

The following organizations collaborated in compiling the information for this fact sheet:

American Association of Diabetes Educators
http://www.aadenet.org

American Diabetes Association
http://www.diabetes.org

Centers for Disease Control and Prevention
http://www.cdc.gov/diabetes
http://www.cdc.gov/nchswww

Department of Veterans Affairs
http://www.va.gov/health/diabetes

Health Resources and Services Administration
http://www.hrsa.dhhs.gov

Indian Health Service
http://www.ihs.gov

Juvenile Diabetes Foundation International
http://www.jdfcure.org

National Diabetes Education Program:
A joint program of NIH & CDC
http://ndep.nih.gov
http://www.cdc.gov/diabetes

National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health
http://www.niddk.nih.gov

U.S. Department of Health and Human Services
Office of Minority Health
http://www.omhrc.gov

National Council of La Raza
http://www.nclr.org

Citation: Centers for Disease Control and Prevention. National Diabetes Fact Sheet: National estimates and general information on diabetes in the United States. Revised edition. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 1998.

New heading signals a new label.

More consistent serving sizes, in both household and metric measures, replace those that used to be set by manufacturers.

Nutrition Facts

Serving Size ½ cup (114g)
Servings Per Container 4

Amount Per Serving

Calories 90	Calories from Fat 30
	% Daily Value*
Total Fat 3g	**5%**
Saturated Fat 0g	**0%**
Cholesterol 0mg	**0%**
Sodium 300mg	**13%**
Total Carbohydrate 13g	**4%**
Dietary Fiber 3g	**12%**
Sugars 3g	
Protein 3g	

Vitamin A	80%	•	Vitamin C	60%
Calcium	4%	•	Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

More nutrients may be listed on some labels.

New Manadatory component helps consumers meet dietary guidelines recommending no more than 30 percent of calories from fat.

Nutrients required on nutrition panel are those most important to the health of today's consumers, most of whom need to worry about getting too much of certain items (fat, for example), rather than too few vitamins or minerals, as in the past.

%Daily Value shows how a food fits into the overall daily diet.

Reference values help consumers learn good diet basics. They can be adjusted, depending on a person's calorie needs.

Conversion guide helps consumers learn caloric value of the energy-producing nutrients

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